times the splenius and the complexus are affected on the same side; and there is also a definite and distinct form of spasm which is known as retrocollic spasm. The following case is an example: One day a lady came into my room and sat in an armchair. While speaking her head suddenly went back and she became rapidly cyanosed. If I had not pulled her head vigorously forward she might have died of asphyxia. She explained that she had been in danger of losing her life several times, but, fortunately, on each occasion some kind friend had been at hand to help her. In this case of retrocollic spasm there was a sudden contraction of the two splenii. You can generally tell which kind of spasm is present by careful analysis of the movements, and by noticing which muscles are affected. And you confirm your examination by feeling the hardness of the muscles when the spasm comes on, and by electrical tests.

With regard to the etiology of these cases, it is certain that in all these instances there is a distinct mind element at work. Many of them have some history of mental aberration in the family. Some have had relatives who have committed suicide, and the patients themselves have ultimately done so. In a large number the spasmodic tic, as it is called, has come on after severe shock. In a case of mine the lady's brother committed suicide. A few days after that came the failure of a bank, which caused her great monetary loss, and from that time she developed a persistent tic. Such patients go through a large amount of treatment, and there are many remedies tried, though most of them are of no avail whatever. Some do well with nerve tonics, such as valerianate of zinc, assafoetida, and so on. But it is found that after a time the effects of these drugs wear off, and the case gets steadily worse. Others do very well indeed on bromide of potash and conium for a space, and some improve on morphine; but any one who is convinced as to the nerve element in this affection will not prescribe morphine for it, as such patients are apt to become morphinomaniacs. In cases of increasing severity operation is imperative. There are several forms of surgical procedure which have been used, some of which give temporary alleviation, and others give permanent. So far as I know, you may take it as certain that it is no good dividing the affected sterno-mastoid. The spasm is not alleviated, and the patient is disappointed. The spinal accessory nerve has been attacked, and either stretched, or ligatured, or part of it has been removed. Until 1888 that was the best form of treatment known. If the spasm is very early, and if it be a sterno-mastoid which alone is affected, the other muscles being scarcely involved at all, then ligature or excision of a portion of the spinal accessory nerve will in a few cases do some amount of temporary good. But an extended experience has shown that the spasm returns, and in muscles other than those supplied by the spinal accessory, such as the complexus, splenius, and trachelo-mastoid, and therefore it became imperative to devise some method of treatment which gives better results. The credit of treating these cases by a radical method belongs chiefly to the late Dr. Gardner, Professor of Surgery at Adelaide. And at the same time as he conceived the idea Professor Keen of Philadelphia operated in this way, and I believe they published their accounts of the operation simultaneously or all but so. But it transpired that Dr. Gardner's case had been done a few days before Dr. Keen's, so priority belongs to Dr. Gardner. The operation strikes one as being severe for this condition, but those of you who have witnessed the mental agony, the distress and hopelessness, the nervous irritability and sensitiveness of these patients, will realize the terrible condition of some of them if left to themselves. The operation consists in cutting down on the posterior primary branches of the cervical nerves and removing a portion of them. An incision is carried outwards from the occipital protuberance to the mastoid process, and a second one from the latter point to the spinous processes of the sixth cervical vertebra. The flap is dissected up and turned to the middle line. The occipital artery is ligatured, and then the muscles are defined. The first one seen is the trapezius, which is divided and turned out of the way. Next are seen two other muscles—the splenius and part of the complexus. Now cut through the splenius capitus and turn the ends out of the way and retract the parts. This gives a good view of the deeper structures. The complexus is now well exposed, and a part of the operation,

which is somewhat difficult, is so to divide the complexus as to do it safely and at the same time to hit off the muscular planes. One point which I find of the greatest advantage is to separate the complexus from its vertical attachment, and this may be done with ease if you first define the inner border. Now pass your finger underneath the muscle until you feel the outer border, and separate the deep attachments of the complexus with your finger. The complexus is then easily and safely cut across. In turning the upper end towards the head you will find the branches of the suboccipital nerve which run into it, and the suboccipital triangle is seen. In the floor of it is the vertebral artery and vein and the suboccipital nerve. The vein may be very large. I have seen it as big as an internal jugular. Coming out below the obliquus inferior you see the largest nerve of all—namely, the second cervical nerve, giving off the great occipital. You can sometimes trace up a small branch of communication with the first. This is a guide to the suboccipital nerve as it emerges from beneath the vertebral artery. The posterior primary branches of the third and fourth nerves are now readily defined and their branches to the muscles. The trunks should be traced as far back as possible and $\frac{1}{2}$ in. to $\frac{1}{2}$ in. excised close to the vertebral column. An important point is to make sure that the nerve supply to the trachelo-mastoid is destroyed, otherwise recurrence of the spasm will take place.

By this operation you deprive the back part of the head of sensation and also the skin of the neck, and you break the vicious reflex circle which runs through the sensory nerves. At the same time you cut out the motor supply to the posterior cervical muscles and so stop the vicious movements. It is undoubtedly the best form of operation known for this condition.

The false form of torticollis is associated with spinal caries, and follows cicatrices of burns and wounds in the neck. It is evident that the head is displaced by reflexly irritated muscles, bony deformity, or pulled over by scar tissue, and therefore the deformity is termed torticollis, because the neck is twisted in some cases in a way very similar to that seen in true wry-neck.

WOUND OF THORACIC DUCT: LIGATURE: RECOVERY.

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SOME years ago a wound of the thoracic duct was looked upon as a very serious accident. Thus, Erichsen¹ states that "the condition may be regarded as inevitably fatal." He quotes six cases recorded by Bradley and one by Krabbel, in all of which death took place. These cases, however, had injuries to other structures which of themselves would have been serious. He also mentions a doubtful case, recorded by Kirchner, of a girl aged 9, who had run violently against a parapet fourteen days before. A litre of chyle was withdrawn by aspiration from the right pleura, and the patient recovered.

When the accident happens, however, during a surgical operation, the following case proves that the prognosis is good if suitable treatment be adopted.

A girl, aged 24, was admitted to the Royal Victoria Hospital on July 22nd, 1905, suffering from a large number of tuberculous glands on both sides of the neck. These occupied both supra-clavicular regions and the right submaxillary triangle. Those on the right side were removed on July 27th by an extensive operation, and it was thought wiser to defer the removal of those on the left till the wounds on the right had healed. Accordingly, about twelve days later, a transverse incision was made parallel to, and about an inch and a half above, the left clavicle. A large number of affected glands were found extending down as far as the pleura, to which several were adherent, and forward under the sterno-mastoid muscle. During the removal of these a sudden gush of opalescent fluid was seen to come from beneath the sterno-mastoid. This collected in the depths of the wound, and soon coagulated into a soft greyish clot. On sponging up the fluid it was found to issue from the open mouth of a vessel just in front of the scalenus anticus muscle about an inch above the inner end of the clavicle. An artery clip was applied to the open end of the discharging vessel, and the latter was ligatured with formalin catgut. The duct on the proximal side of the ligature immediately became distended, so as to form a flat, button-shaped

swelling, tense and grey, about $\frac{1}{2}$ in. in diameter. This enlargement felt so tense that it seemed ready to burst, and great care was taken to prevent this. The distal end was now sought for, and was seen to be about an inch in length, extremely like a thin-walled vein, and dividing near its termination into three smaller vessels, which opened separately at the junction of the internal jugular with the subclavian vein. No fluid issued from this portion of the duct, but on passing a grooved director through it, and along one of the terminal branches into the innominate vein, blood flowed along the groove. On removing the director this bleeding ceased, thereby showing the action of the valves of the duct. This end of the duct was also ligatured, although at the time of operation no leakage appeared likely to occur. The remaining glands were now removed, the wound was stitched up by a continuous silkworm gut suture, and a glass drainage tube was inserted for forty-eight hours. On account of the risk of the rupture of the proximal end of the ligatured duct, the patient was kept on the lowest possible diet for a few days, and all unnecessary movements were interdicted, so as to diminish as much as possible the pressure and flow in the occluded duct pending the establishment of the collateral circulation. The dressings were inspected at frequent intervals in order to ascertain whether leakage had taken place through the drainage tube, in the event of which I proposed to open up the wound and again deal with the duct. The patient fortunately did not vomit after the operation, and made an uninterrupted recovery without any swelling or sign of leakage. She was weighed on the fourth day and each week for seven weeks. She lost 4 oz. during the first week, gained over 4 lb. the second, 7 lb. the third, nearly 2 lb. the fourth, under 1 lb. the fifth, 2 lb. the sixth, and practically nothing the seventh week, so that now she is nearly 1 st. heavier than when she was operated on. A blood count by Dr. Houston on the eighth day after the operation was as follows: Polymorphonuclear leucocytes, 72 per cent.; small lymphocytes, 23 per cent.; large lymphocytes, 4 per cent.; and eosinophiles, 1 per cent. It will be seen from this that there is very little deviation from the normal as regards the lymphocytes—the constituents of the blood perhaps most likely to be affected by the accident.

The history of this case would appear to show that if leakage from the duct can be prevented and rupture avoided after ligature, the collateral circulation becomes established without any difficulty. The previous operation on the right side of the neck does not seem to have interfered with this, although a good deal of damage must have been done to the lymphatic channels in connexion with the right lymphatic duct.

Cheyne and Burghard² have had to do with two cases of accidental wound of the thoracic duct; one occurred during the extirpation of tuberculous glands, and one during the removal of glands invaded by malignant disease. Recovery took place in both cases. They recommend that the skin should be closely stitched up and pressure maintained upon the part by a sponge incorporated with the dressings. The fact, however, that in both these cases, when the pressure was removed ten days after operation, swelling took place under the skin due to the escape of chyle, would seem to indicate that this method may not always be satisfactory. Besides, pressure is difficult to apply to the neck.

Priestley Leech³ mentions 21 cases collected by Benetau. In 8 the duct was wounded during the extirpation of tuberculous glands; in 3 during the removal of glands invaded by malignant disease; and once while ligaturing the subclavian artery for aneurysm. Deanesly,⁴ operating for tuberculous glands, divided the duct, which was then inserted into the internal jugular vein and sutured. There was some leakage, but this soon ceased, and the patient recovered. Bergmann⁵ quotes 7 cases under the care of the following surgeons respectively: Wilms, Schönborn, Schwinn, Brohl, Keen, Phelps, and Cheever, only 1 of which died as the result of the injury. In Schönborn's case cyanosis and collapse followed as the result of the entrance of air into the veins. The duct was tied at both ends and divided between the ligatures. Symptoms of air embolism persisted for two days, but the patient recovered. Quite recently Bucknall,⁶ of University College Hospital, recorded 2 cases. One occurred during the extirpation of tuberculous glands and one during the removal of glands infected from malignant disease of the breast. He draws attention to the extraordinary loss of strength and energy which occurs when the chyle is allowed to leak away, as happened for a few days in his first case. He found plugging ineffectual, and had to resort to ligature of both ends on the sixth day. Both cases recovered.

From a study of the recorded cases it would appear that the dangers of the accident are: (1) Entrance of air

into the veins of the neck (Schönborn's case); (2) rupture of the distended duct on the proximal side of the ligature; (3) inanition due to the draining away of the chyle; (4) possible dissemination of tubercle due to the entrance of organisms into the veins by way of the torn thoracic duct. Bucknall suggests that the subsequent history of his first patient, who died later of general miliary tuberculosis, may be so explained. In a similar way it is conceivable that malignant disease may be disseminated.

With regard to treatment, the first indication is to stop the flow from the injured duct. This can be effected most surely, and apparently quite safely, by ligature of both ends. If the wound is small it may be sutured without occluding the vessel, as in Keen's case. Packing is likely to be effective if the wound is small, but if the latter is large or the duct completely severed, as in my case, the more satisfactory method is ligature. Packing may fail, as in Bucknall's case, which leaked to the extent of two to three pints a day in spite of the plugging. Schwinn's case was treated by clamps, which came off on the third day, the patient making an excellent recovery. Finally, the patient ought to be kept quiet and on low diet, so as to limit the pressure in the obstructed duct.

The patient referred to in this article was examined on June 6th, 1906, ten months after the operation, and found to be quite well. There was no dissemination of tubercle and no recurrence.

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THE ETIOLOGY AND TREATMENT OF OBLIQUE INGUINAL HERNIA.

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THOUGH the presence of an inguinal hernia must be due to some weakness of the structures through which the abdominal contents escape, the question yet to be answered is, What are the chief factors which constitute this weakness and so determine the descent of the bowel? It is, I believe, generally admitted that in the great majority of such herniae which occur during infancy the local weakness is due to the presence of a preformed sac, an unobliterated portion of the processus vaginalis testis. In the ordinary hernia of adult life, however, the local weakness is not as a rule considered to be due to any such congenital defect, but to be confined to the muscular and aponeurotic structures of the abdominal wall, which permit the bowel to escape by pushing the parietal peritoneum in front of it.

This division of hernia into congenital and acquired has of recent years been severely criticized, more especially by Mr. R. Hamilton Russell of Melbourne, and I propose to adduce what evidence I can in favour of my belief that the presence of a congenital or preformed sac is the main factor in the causation of inguinal hernia during all periods of life.

Before offering any theoretical explanations concerning the conditions which predispose to the formation of a hernia, I would remind you of certain well-ascertained facts. Hernia may appear for the first time at any age, but the greatest number of herniae are developed during the most active period of life, and age lessens their frequency. In the first year of life a larger proportion of persons are ruptured than during any subsequent year. A large increase in the production of hernia occurs in males between the ages of 11 and 15, and in females between the ages of 16 and 20. Inguinal hernia occurs nearly six times as often as all other divisions taken together.

THE CONGENITAL AND THE ACQUIRED SAC.

It will be advisable before attempting to distinguish between the two forms of sac in the inguinal region, to study the formation and structure of a typical congenital and a typical acquired sac in order to compare them and clearly understand in what respect they resemble or differ one from the other.

For this purpose we will compare the sac of a hernia